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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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SECURITY INFORMATION

COUNTRY	USSR (Moscow and Novosibirsk Oblasts)	REPORT	[redacted]
SUBJECT	1. Development of Modulation Tubes at NII-160, Fryazino 2. Tube Production in Novosibirsk	DATE DISTR.	16 October 1953
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THE APPRAISAL OF CONTENT IS TENTATIVE.
(FOR KEY SEE REVERSE)

[redacted]

Institute 160 in Fryazino

1. German engineers Gerhard Haucke and Otto Sperling worked in the laboratory for the development of transmitter tubes in the Magnetron Department of Institute 160 in Moscow/Fryazino. The department primarily worked on the development of modulation tubes, most of them copies of US models, for which records and sometimes samples were available.

2. Type 5D21 tubes were used as basic models for the development of a series of modulation tubes with increased capacities and higher tensions. The production of a tube with doubled capacity was started in late 1950 at a rate of 10 to 15 units per month. From requests for individual parts, [redacted] a monthly output of 50 units was planned. On the test stand another tube of this series reached an output four times as high as the 5D21, with an anode voltage of 35 kv. During one of the tests, the tube was fed with 40 kv. The first prototypes of this type of tube were completed by late 1950, and quantity production was planned. It might have started about three months later. Another type of modulation tube, referred to as Samovar by the Germans, had been designed for a pulse power of 10,000 kw, but reached only 3,000 to 5,000 kw at a tension of 25 kv. At the test stand, tensions of 30 to 32 kv were reached. The voltage resistance of the cathode was sufficient while the other electrodes manufactured suffered from flashovers and grassing, caused by inadequate material and unclear surfaces. [redacted] the quality of these tubes was poor to fair. The production of the Samovar type tube was started in late 1949 at a monthly rate of five units. The scheduled monthly production output of ten tubes was not reached by the end of 1950. [redacted] the Soviets had made enormous efforts in order to accomplish the development of the modulation tub

3. From April to early July 1950, when this department became off-limits to all German personnel, including glass blowers, [redacted] in the Magnetron Department on glass- and vacuum problems connected with the tubes developed there. Some of the

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laboratories of the Magnetron Department worked in three shifts. Prior to July 1950, only the Soviet copy of a three cm magnetron was produced. Five or six types of magnetron tubes had been developed from the latest US models and were adapted to fit the output of the three modulation tubes developed at NII-160. Several other types of tubes [redacted] were also developed. Experiments were made with magnetron tubes with wave lengths below one cm. [redacted] there were plans for a monthly output of 100 magnetron tubes. By July 1950, however, only smaller series had been manufactured in the laboratory. 50X1-HUM

Novosibirsk Tube Factory[1]

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4. [redacted]

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5. The old section of the plant had a workforce of about 5,000 people, which after the completion of the new plant building will probably be increased to 6,000 to 8,000 persons. The plant director died in 1950. The plant, which was constructed during the war, was equipped with machinery from the Leningrad tube factory. [redacted] Most of the machines and instruments installed there were of US origin and dated from the period between 1920 and 1929. [redacted] a new welding set for the welding of bulbs and base plates of 6A7 and 6A8 type tubes arrived from the US. The Soviet engineers were glad that it had been possible to get this set in spite of the growing strain in the relations between the US and the USSR. The Soviets stated that this type of welding set was not yet produced in the USSR.

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6. The Soviet engineers were very familiar with the 16 unit automatic vacuum pumping set delivered by the General Electric firm. The set had been in operation at the plant for a long time, but the Soviets were not able to handle the 48 unit Telefunken pumping set, which was used for the production of 6A7 and 6A8 type tubes. Because of the wrong glass and vacuum technical procedures, the average output of the automatic vacuum pump was only 20 to 40 percent of its capacity, and the highest output ever reached was 60 percent. When [redacted] succeeded in increasing the average output to 75 percent of capacity, this department was awarded a flag. By mid-April 1950, both types of tubes were produced in two shifts, with the automatic vacuum pumping set having an output of 1,200 to 1,500 tubes per shift. A third work shift was put in only occasionally, to overcome a backlog or to produce another type of tube. The personnel of this department included four male engineers, 12 to 15 female technicians without any experience, and about 150 female laborers for the assembly per shift. About 200 additional women worked only one shift and 50 men and women did auxiliary work. 50X1-HUM

7. In addition to the difficulties experienced with the automatic pumping set, the production was also hampered by the insufficient degree of purity of the materials, which received inadequate precision treatment during the manufacturing process, and the lack of skilled personnel. Most of the new engineers were women whose technical knowledge could be compared to that of a German mechanic. There were only five men among 70 graduates from a technical school in Novosibirsk. In the glass working department, most of the difficulties were connected with the fusing of glass and metal and with annealing. These technical problems had to be solved by [redacted] Soviet engineer Cherapnin, who had been the director of Oberspreewerk in Berlin after 1945 and was sent back to the USSR in fall 1948 after he had attempted to escape to the West. 50X1-HUM

8. In the antechamber of chief engineer Katzmann, who had been assembly chief under Bersarin at Oberspreewerk in Berlin, there was a chart showing transmitter tubes with an output of up to 20 kw produced at the plant. The models were comparable to German tubes produced between 1930 and 1938. Katzmann repeatedly talked [redacted] about the production of small transmitter tubes by automatic pumping sets

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and he also talked about another assignment [redacted] to Novosibirsk to solve this problem. [redacted] modern types of tubes were also being produced at this plant and [redacted] powder-metallurgy tubes were being developed. [redacted] an engineer of the Novosibirsk plant was awarded the Stalin Prize for the development of a powder-metallurgy tube.

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9. Following is a list of machinery observed [redacted] on the right-half of the ground floor of the tube plant in Novosibirsk:

   a. About 150 welding machines for the construction of receiver tubes.

   b. Two US automatic pumping sets, old models, for steel tubes.

   c. Three German 48 unit Telefunken type automatic pumping sets. Two of the sets were not in operation because the vacuum pumps and other mechanical parts, such as gears, were missing. It was doubted at the plant that it would be possible to obtain these missing parts.

   d. Two large General Electric welding sets. One set was manufactured in 1928/1930, and the other, which arrived in 1950, was built in the middle of WW II.

   e. Three automatic sets for the production of bases for steel tubes. The sets are of US origin and were constructed in 1928/1930.

   f. One machine to weld together and cut into sections copper and nickel wires.

   g. One large annealing furnace with conveyor line passing through.

   h. One so-called folding machine for steel tube bases. The machine was of US origin and connected the bases with the bulbs.

   i. Testing equipment for receiver tubes.

   j. Various machines and instruments for preparing single parts.

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1. [redacted] Comment: [redacted] probably referring to the Svetlana Tube Plant No. 617.

2. [redacted] Comment: Sentence as received. [redacted] may have meant "escorted" or "exhorted".

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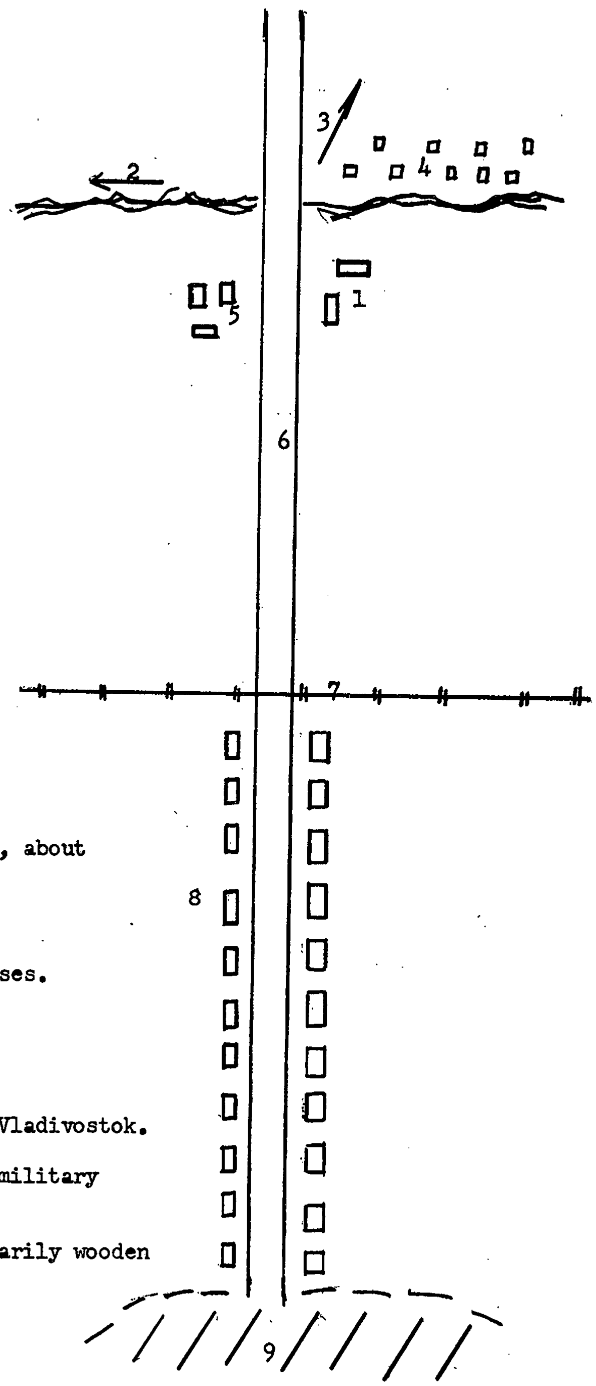
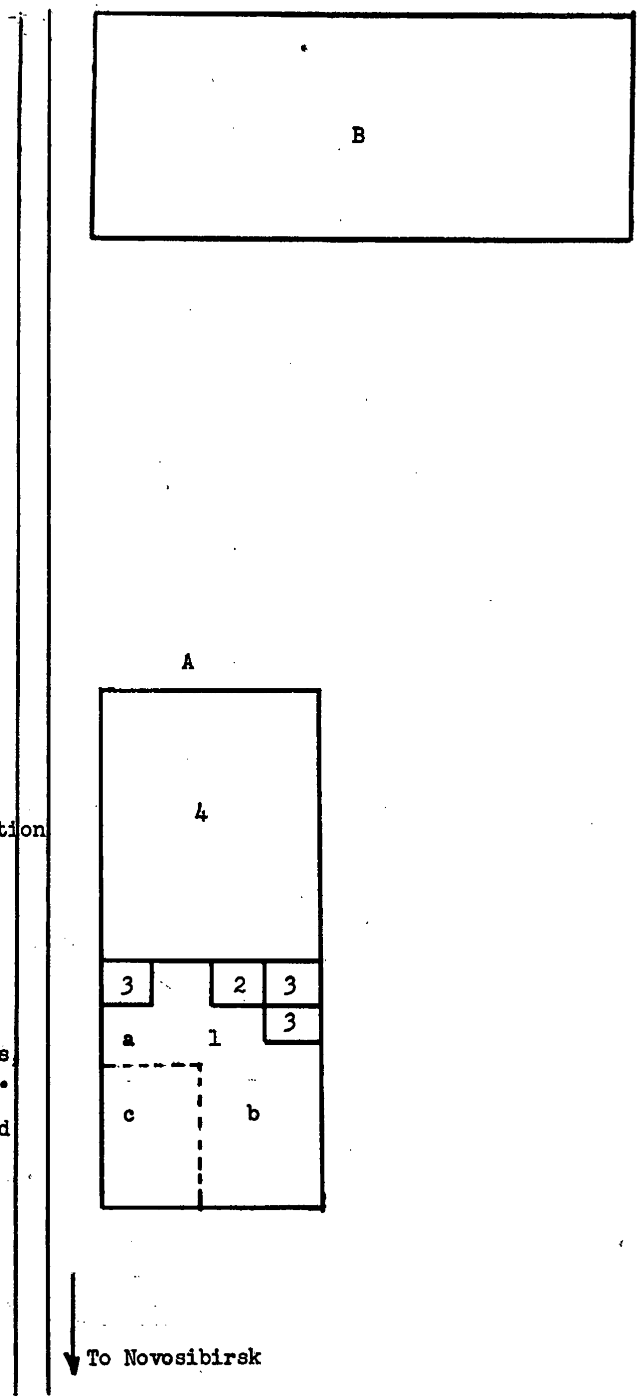
Location Sketch of the Tube Factory in Novosibirsk



Key to Sketch:

1. Tube plant.
2. Rivulet, five or six meters wide, about 150 meters north of the plant.
3. Three km. to a civilian airport.
4. Settlement composed of small houses.
5. New apartment houses.
6. Road, about 30 meters wide.
7. Double-tracked railroad line to Vladivostok.
8. So-called diplomat quarter with military academy.
9. Old section of Novosibirsk, primarily wooden buildings.

Layout Sketch of the Tube Factory in Novosibirsk



Key to Sketch:

A. Old building, about 25 x 60 m, with five stories.
  1. Ground floor.
    a. Vacuum department.
    b. Vacuum department and production of tube accessories.
    c. Assembly shop.
  2. Annealing furnace.
  3. Offices.
  4. Unknown part of plant.

  The second floor housed chemical laboratories, the laboratory for the production of transmitter tubes, and the production of single parts.

  The third floor housed offices, and the fourth floor was guarded.

B. New, three-story, brick building, almost completed. Installation of equipment was to have taken place in July 1950.